1/11
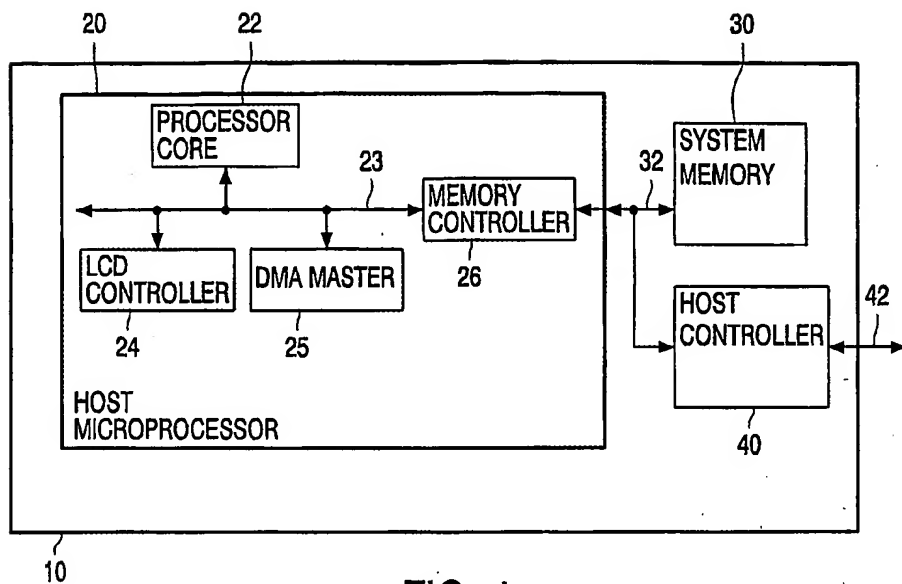


FIG. 1



FIG. 2
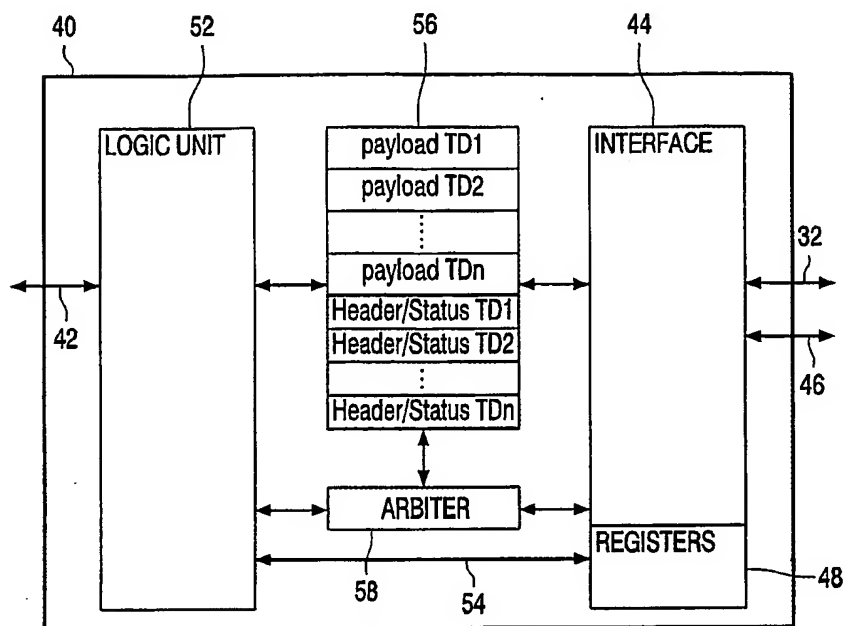
FIG. 3
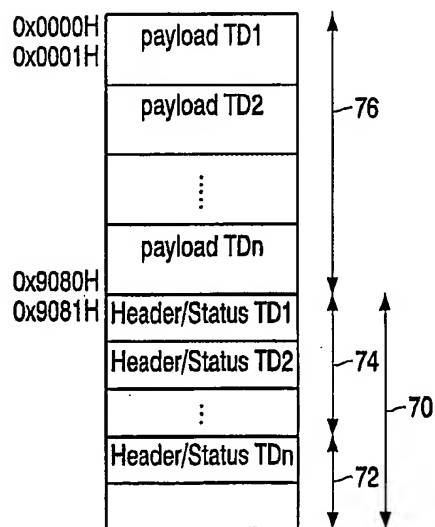


FIG. 4

FIG. 5

FIG. 6

| 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 |
|---|
| V |
| Uframe [2:0] |
| D S<br>T C |
| Maximum Packet Length | NBytes To Transfer |

| BPS<br>S C E<br>S S E | RL | Ex | uFrame [7:0] |
| Data Start Address | Ramstructure<br>Pointer |

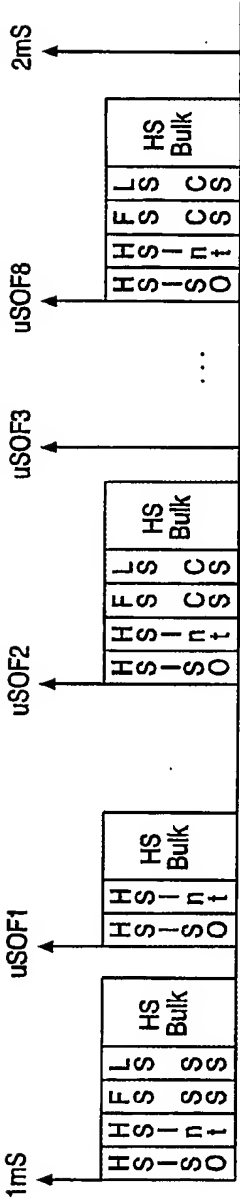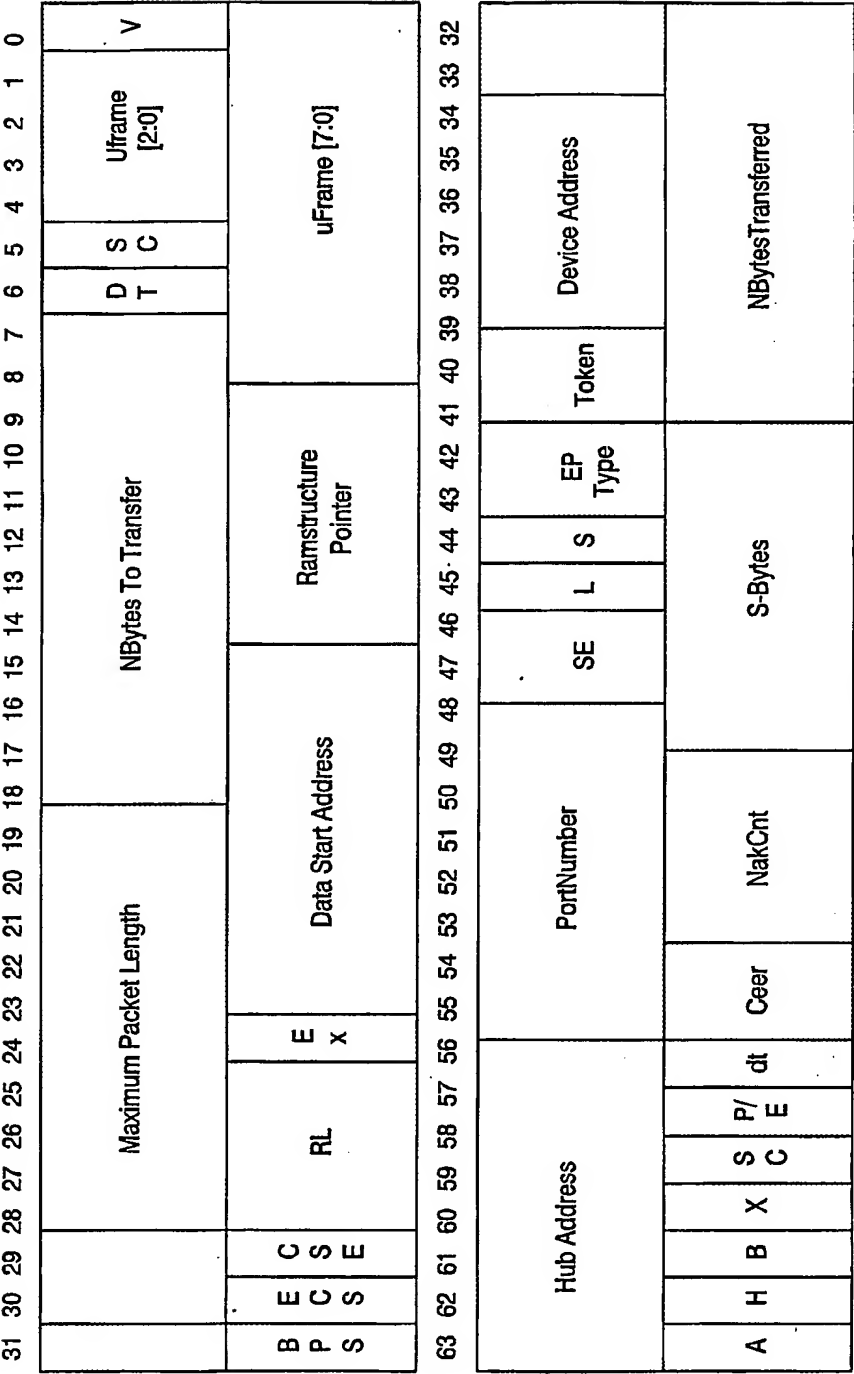| 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 |
|---|
| A H B X S P/ dt Ceer<br>S C E | PortNumber | SE L S | EP<br>Type | Token | Device Address |
| NakCnt | S-Bytes | NBytesTransferred |

**FIG. 7a**

| NAME | DESCRIPTION |
|---|---|
| Hub Address (6:0) | This field holds the device address of the transaction Translator's (TT) hub |
| Port Number (6:0) | This field is the port number of the recipient TT |
| SE(1:0) | This definition depends on the endpoint type and direction. It is only valid for split transactions. |
| L | Last: This indicates of it is the last complete-split transaction that is scheduled (only used for periodic split-transaction) |
| S | This bit indicates if a split transaction has to be executed or not. 0: HS transaction   1: Split transaction |
| EPType(1:0) | Transaction Type.  00b: control  01B: Isochronous  10b: Bulk  11b: interrupt. |
| Token(1:0) | Token PID for this transaction 00b: OUT  01b: IN  10b: SETUP  11b: PING |
| Device Address (6:0) | This is the USB address of the function containing the endpoint that this buffer refers to. |
| EndPt(3:0) | This is the USB address of the endpoint within the function. |
| Mult(1:0) | This field is a multiplier used to keep the host controller as the number of successive packets the host controller may submit to the endpoint in the current execution. For periodic list, this is a copy of the MULT field in the iTD of QH. For the asynchronous list, this is set to Async Schedule Park Mode Count if the Async Schedule Park Mode is enable and the endpoint speed is high-speed and the token that has to be sent is an IN or an OUT. If this is not the case then this field must be set to 01b. |

FIG. 7b

| Field | Description |
|---|---|
| Maximum Packet Length (10:0) | This field indicates the maximum number of bytes that can be sent to or received from the endpoint in a single data packet. |
| NrBytes To Transfer | This field indicates how many bytes can be transferred by this data structure. It is used to indicate the depth of the DATA field. |
| Uframe (7:0) | 8 LSB of the Uframe number. This is only uses for transactions on the periodic list. Bits 2 down to 0 indicat during which uFrame the transaction must be executed. Bits 7 down to 3 are used to calculate the Frame Tag field. |
| V | This indicates if the data in the current structure is valid or not. This bit needs to be handled in a different way by the usd_hs_exec_trans module if the modules are used in a EHCI slave architecture. |
| A | This bit corresponds to the active bit in the status field of the iTD, siTD or QH. |
| H | This bit corresponds to the status field of the QH. This bit is default 0 for an Isochronous transaction. |
| B | This bit correspond to the Babbke Detected bit in the status field of the iTD, siTD or QH. |
| X | This bit corresponds to the Transaction Error bit in the status field of the iTD, siTD or QH. |
| SC | This bit correspond to the Split Transaction State bit in the siTD or QH. This bit is default 0 for a high-speed transaction. |
| P/E | For Split Transactions on the periodic list this bit indicates if an ERR handshake was received. For HS transactions this bit corresponds to the Ping State bit in the Status field of a QH. |

FIG. 7c(1)

| Field | Description |
|---|---|
| dt | Data Toggle. This bit corresponds to the data toggle bit in the QH. This field is default 0 for isochronous transactions. |
| Ceer (1:0) | Error Counter. This field corresponds to the Cerr field in the QH. This field is default 0 for isochronous transactions. |
| NakCnt (3:0) | Nak Counter. This field corresponds to the Nak Counter field in the QH. This is default 0 for isochronous transactions. |
| S-bytes (6:0) | This field corresponds to the S-bytes field in the QH. It keeps track of the number of bytes sent or received during an IN or OUT split transaction. |
| NrBytes Transferred (11:0) | This field indicates how many bytes are sent or received for this transaction. If Mult is greater than one, then it is possible to store intermediate results in this field. |
| BPS | Back Pointer Status. This bit is only used for siTD. If set then the status information in this word corresponds to the data structure referenced by the Back Pointer. |
| ECS | Execute CS and SS. This is used for split isochronous transactions to differentiate between case 2a and 2b. This bit can only be set of only BPS is set. This means that a split transaction has to be executed if the result of the complete transaction is that the Active bit of the Back Pointer must be cleared. |
| CSE | CS and SS executed. This bit is set of there is both CS transaction executed to the same isochronous endpoint. |
| RL | Reload field. This is a copy of the RL field in the QH. For iTD and siTD this must be set to 0h. |

FIG. 7c(2)

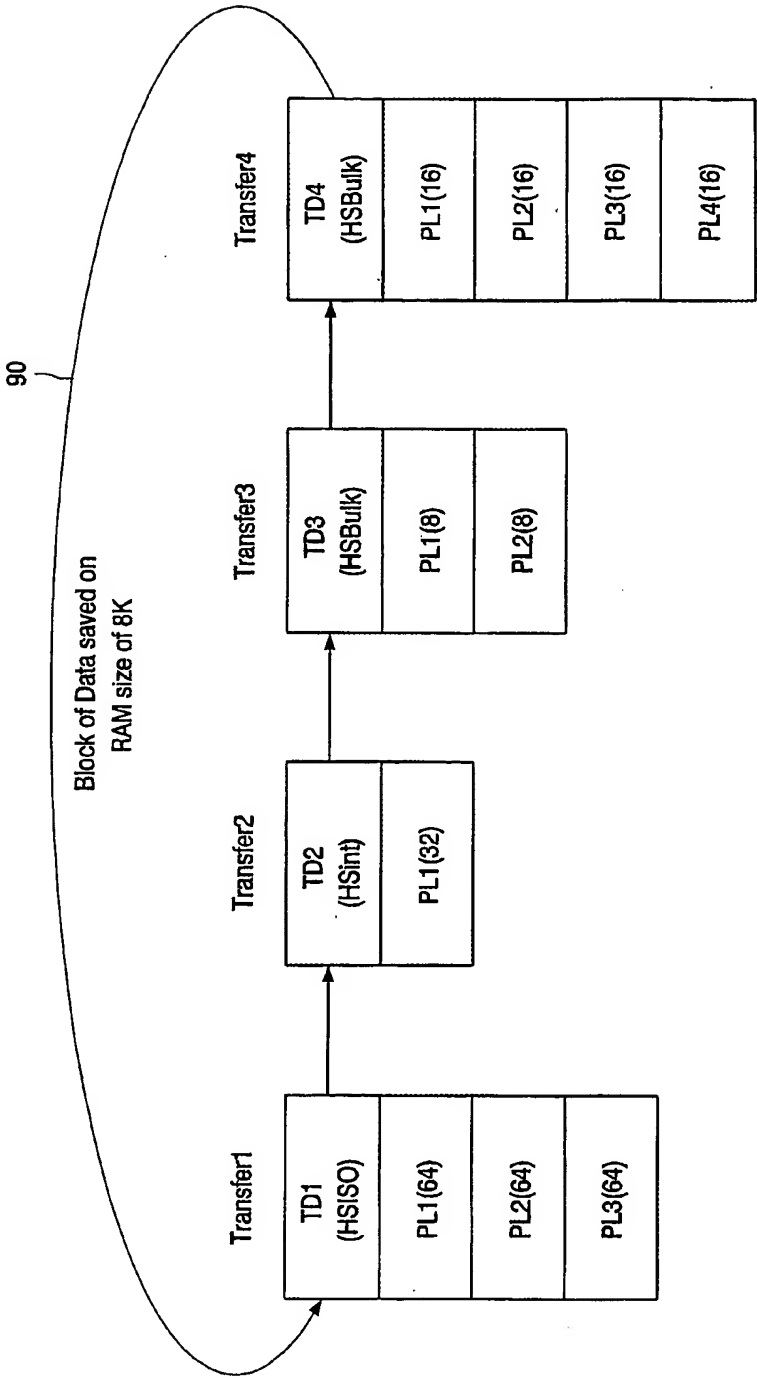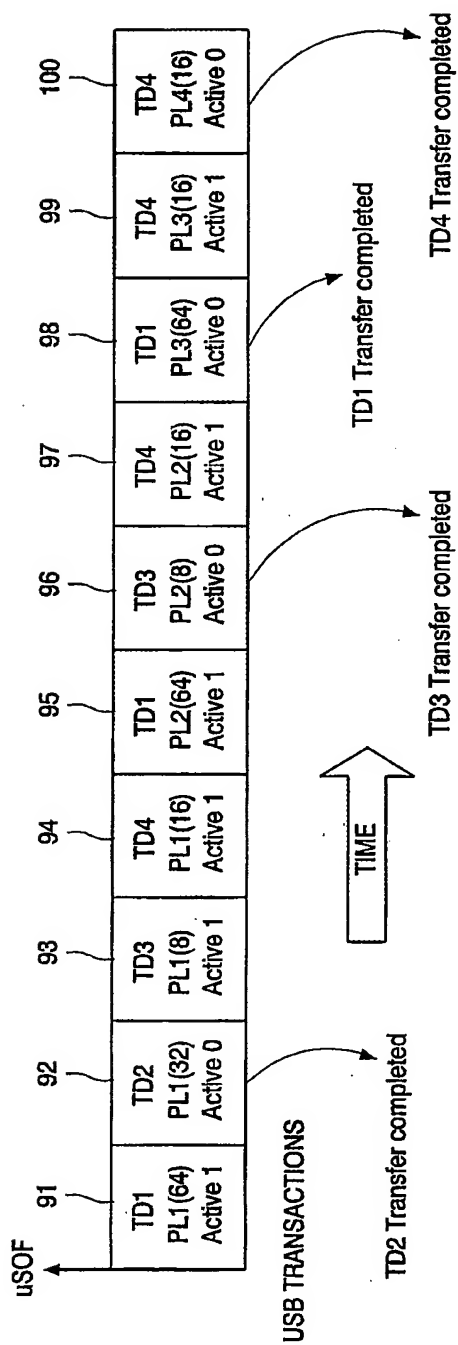| Ex | Packet Executed. This bit may be set by Exec_Trans to indicate that there was a packet sent on the USB bus. This is only used for periodic transactions. For asynchronous transactions this bit should always be 0. |
|---|---|
| Data Start Address (20:0) | This is the start address for the data that will be sent/received on/from the USB bus. |
| RAM structure pointer (4:0) | Pointer to the actual data structure where this header is derived from. This os an address in the RAM periodic of the RAM async. |

FIG. 7c(3)

FIG. 8

FIG. 9